

## **REMARKS**

Claims 1, 4-7, 9, 10, 12, 14-16, 19-21, and 30-41 are pending. Upon entry of the present amendment, claims 1, 4-7, 9, 10, 14-16, 19-21, 30, 31, 33, and 35-41 will be pending, claims 1, 4-7, 10, 14-16, 21, 37, and 38 having been amended and claims 12, 32, and 34 canceled in the present amendment.

### **Information Disclosure Statement**

In accordance with the Examiner's request, submitted herewith are an Information Disclosure Statement and a copy of reference CA 2,253,515, which was previously cited in the Information Disclosure Statement of September 15, 2004.

### **Claim Objections**

Claim 1, 4-7, 10, 12, 14-16, 21, 37, and 38 were objected to because the term "polyester polymerization" was considered unclear. The claims have been amended to replace the objected-to language with "polymerization catalyst for producing polyester."

Claims 5 and 6 were objected to because the terms "provided that" and "may contain" were considered superfluous. The claims have been amended to replace the objected-to language.

Claims 12 and 34 were objected to as depending from a canceled claim. Claims 12 and 34 have been canceled, rendering the objections moot.

Claim 32 was objected to under 37 C.F.R. 1.75 as allegedly being a substantial duplicate of claim 9. Claim 32 has been canceled, rendering the objection moot.

Withdrawal of the objections is therefore requested.

### **103(a) Rejections over Jackson**

Claims 1, 4-7, 9, 10, 19, 30-32, and 37-41 were rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson (US 3,847,873). Applicants traverse the rejections.

Applicants have discovered a non-antimony-based polymerization catalyst having excellent effects, such as a high catalytic activity; capable of yielding a polyester that is excellent in color tone without having a yellowish color; and capable of yielding a polyester that has a

high thermal stability. Applicants have discovered that combining an aromatic phosphorus compound with aluminum or an aluminum compound produces these excellent effects, where neither compound alone has any practical catalytic effect. Applicants have therefore discovered the following technical features of the claimed invention:

(1) By using an aromatic phosphorus compound in combination with aluminum or an aluminum compound, the polymerization activity of the aluminum or aluminum compound is enhanced to a sufficient practical level;

(2) The obtained polyester has excellent color tone, which is improved over that of polyester produced with a conventional catalyst, e.g., a titanium-based catalyst; and

(3) The obtained polyester has excellent resistance to thermal decomposition, which is improved over that of polyester produced with a conventional catalyst, e.g., a titanium-based catalyst.

See, e.g., the specification, page 4, lines 1-9.

In contrast, Jackson neither teaches nor suggests a polymerization catalyst for producing polyester, in which the catalyst comprises an aluminum substance and a phosphorus compound having an aromatic ring structure, wherein the aluminum substance is selected from metal aluminum, aluminum carboxylates, aluminum salts of an inorganic acid, aluminum chelate compounds, aluminum oxides, and partial hydrolyzates of an organoaluminum compound. On the contrary, Jackson discloses an aluminum compound, aluminum acetylacetone, in combination only with diethyl hexadecylphosphonate, which is *not* aromatic (see Table, Example 6).

The Office Action erroneously asserts that it would be obvious to combine the aluminum compound of Jackson with an aromatic phosphorus compound to produce Applicants' claimed catalyst. This assertion is incorrect for several reasons.

Through extensive experimentation, Applicants were able to discover the above-mentioned polymerization effects of the claimed invention. Such unexpected results would not be obvious from the Jackson disclosure. For example, in the Table of Jackson, a comparison of the Comparative Example with Examples 1 through 6 indicates that higher phosphorus retention results in longer polymerization times. This suggests that the Jackson catalyst using phosphorus has *decreased* catalytic activity. As such, it would not be obvious to a person skill in the art,

based on the Jackson disclosure, that a combination of aluminum and phosphorus (with an aromatic ring structure) compounds could produce the high catalytic activity of Applicants' claimed catalyst.

Moreover, in comparing Examples 2 and 6 of Jackson, the "Y" value, which represents polyester color, increases when using aluminum (in Example 6) versus zinc (in Example 2). As such, the Jackson catalyst using aluminum has an *increased* yellowish color. Using aromatic phosphorus compounds in Examples 3 and 5 also do not appreciably eliminate the yellowish color. In contrast, the polyester obtained using Applicants' claimed catalyst does not have yellowish color, which is most preferred. Therefore, it would not be obvious to a person skilled in the art, based on the Jackson disclosure, that a combination of aluminum and phosphorus (with an aromatic ring structure) compounds could produce the excellent color tone, without yellow color, of the polyester produced from Applicants' claimed catalyst.

Furthermore, as shown in Examples 1 through 5, the intrinsic viscosity rises when using an aliphatic phosphorus compound (in Examples 1, 2, and 4) versus using an aromatic phosphorus compound (in Examples 3 and 5). This suggests that the aromatic phosphorus compound *reduces* polymerization activity. Additionally, comparing Examples 2 and 6, substituting aluminum for zinc has no appreciable effect on the intrinsic viscosity. In contrast, Applicants' claimed catalyst provides enhanced polymerization activity with combined aluminum and phosphorus (with an aromatic ring structure) compounds. Therefore, it would not be obvious to a person skilled in the art, based on the Jackson disclosure, that a phosphorus compound with an aromatic ring structure or that a combination of the phosphorus compound with an aluminum compound would result in enhanced polymerization activity of Applicants' claimed catalyst.

Because of the unexpected results discovered by Applicants through extensive experimentation, the claims are not believed to be obvious over Jackson. Withdrawal of the obviousness rejections is therefore requested.

#### 103(a) Rejections over Ridland

Claims 1, 4-7, 9, 10, 12, 14-16, 19-21, and 30-41 were rejected under 35 U.S.C. 103(a) as being unpatentable over Ridland (WO 99/28033). Applicants traverse the rejections.

As discussed previously, Applicants discovered through extensive experimentation the unexpected results exhibited by the claimed catalyst. It would not be obvious for a person skilled in the art, based on the Ridland disclosure, to produce Applicants' claimed catalyst.

Moreover, Ridland does not disclose or suggest using a polymerization catalyst comprising an aluminum substance and at least one phosphorus compound, wherein the at least one phosphorus compound is at least a phosphonic or phosphinic acid compound having an aromatic group, and wherein the aluminum substance is selected from metal aluminum, aluminum carboxylates, aluminum salts of an inorganic acid, aluminum chelate compounds, aluminum oxides and partial hydrolyzates of an organoaluminum compound.

The Office Action erroneously relied on the disclosure of aryl phosphates in page 3, line 23, of Ridland. But aryl phosphates are not phosphonic or phosphinic acid compounds having an aromatic group. There is no motivation for a person of ordinary skill in the art to arrive at the claimed invention, i.e. the polymerization catalyst as claimed.

For at least these reasons, the claims are not believed to be obvious over Ridland. Withdrawal of the obviousness rejections is therefore requested.

## CONCLUSION

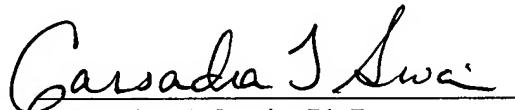
In view of the above reasoning, Applicants submit that the application is in a condition for allowance and request that the amendment be entered. A Notice of Allowance is believed in order.

The Examiner is invited to contact the undersigned to discuss any matter regarding this application.

The Office is authorized to charge any fees or credit any overpayment to Deposit Account No. 11-0600.

Respectfully submitted,

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